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ABSTRACT

A direct diode laser system includes N laser head assemblies (LHAs) generating N output beams. N optical fibers receiving respective N output beams and generating N received output beams, and a torch head recollimating and focusing the N received output beams onto a single spot. Preferably, each of the laser head assemblies of the direct diode laser system includes M modules generating M laser beams, wherein each of the M laser beams has a corresponding single wavelength of light, $M-1$ dichroic filters, wherein each of the $M-1$ dichroic filter transmits a corresponding one of the M laser beams and reflects all other wavelengths, and a fiber coupling device collecting the M laser beams to produce a respective one of the N output beams. In an exemplary case, the $M-1$ dichroic filters function as band pass filters. A method of generating a high fluence, high power laser beam is also described.